

CLAIMS

1. An article comprising:

a code data field including a two-dimensional array of a plurality of rectangular cells to form code data; and

a plurality of corner cells provided to surround the code data field, wherein

at least one of the corner cells occupies a larger area than at least one of the rectangular cells.

2. The article according to claim 1, wherein the corner cells are rectangular or circular.

3. An article comprising:

a code data field including a two-dimensional array of a plurality of rectangular cells to form code data; and

a plurality of corner cells provided to surround the code data field, wherein

the corner cells are round in shape.

4. A method for transmitting image data generated in accordance with a data format for displaying a two-dimensional code on a display, wherein the image data comprises:

data for displaying a plurality of rectangular cells at predetermined coordinate positions on the display; and

data for displaying a plurality of corner cells at coordinate positions surrounding the plurality of rectangular cells which are displayed at the predetermined coordinate positions, wherein

the data for the corner cells and the rectangular cells is configured such that at least one of the corner cells appears larger than at least one of the rectangular cells when displayed.

5. A method for transmitting image data generated in accordance with a data format for displaying a two-dimensional code on a display, wherein the image data comprises:

data for displaying a plurality of rectangular cells at predetermined coordinate positions on the display; and

data for displaying a plurality of corner cells at coordinate positions surrounding the plurality of rectangular cells which are displayed at the predetermined coordinate positions, wherein

the data for the corner cells is configured such that at least one of the corner cells appears round when displayed.

6. An article comprising:

a reference cell having a predetermined shape;

a plurality of polygonal cells in a two-dimensional array to form code data; and

a plurality of corner cells provided to surround an area with the two-dimensional array of the plurality of polygonal cells, wherein

at least one of the reference cell, the polygonal cells and the corner cells is assigned a color different from that of the other cells.

7. The article according to claim 6, wherein the reference cell is assigned a color different from that of the polygonal cells and the corner cells.

8. A method for transmitting image data generated in accordance with a data format for displaying a two-dimensional code on a display, wherein the image data comprises:

data for displaying a reference cell having a predetermined shape at a predetermined position on the display;

data for displaying a plurality of polygonal cells within an area defined with respect to the reference cell; and

data for displaying a plurality of corner cells at coordinate positions surrounding the area, wherein

at least one of the reference cell, the polygonal cells and the corner cells is assigned a color different from that of the other cells.

9. An image analysis apparatus for recognizing an object image included in a frame image, the object image including a reference cell having a predetermined shape and a plurality of corner cells assigned a color different from that of the reference cell, comprising:

 a binarization processor which sets up a range of pixel values in the RGB format so as to translate the frame image into a binary bit representation;

 a first detector which detects the reference cell in binary data for the frame image; and

 a second detector which detects the corner cells in the binary data for the frame image, wherein

 the binarization processor sets up a range of pixel values in the RGB format for detecting the reference cell and binarizes the frame image by extracting pixels within the range thus set up, whereupon the first detector detects the reference cell by referring to the resultant binary data, and

 the binarization processor sets up a range of pixel values in the RGB format for detecting the corner cells and binarizes the frame data by extracting pixels within the range thus set up, whereupon the second detector detects the corner cells by referring to the resultant binary data.

10. A method for recognizing an object image included in a frame image, the object image including a reference cell

having a predetermined shape and a plurality of corner cells assigned a color different from that of the reference cell, comprising:

setting up a range of pixel values in the RGB format for detecting the reference cell, extracting pixels within the range thus set up, and detecting the reference cell in the frame image; and

setting up a range of pixel values in the RGB format for detecting the corner cells, extracting pixels within the range thus set up, and detecting the corner cells in the frame image.

11. A computer readable recording medium having embodied thereon a program product comprising computer readable codes for causing a computer to recognize an object image included in a frame image, the object including a reference cell having a predetermined shape and a plurality of corner cells assigned a color different from that of the reference cell, the program product comprising:

a reference cell detecting module which sets up a range of pixel values in the RGB format for detecting the reference cell, extracts pixels within the range thus set up, and detects the reference cell in the frame image; and

a corner cell detecting module which sets up a range of pixel values in the RGB format for detecting the corner cells, extracts pixels within the range thus set up, and detects the

corner cells in the frame image.

12. A card comprising:

a reference cell having a predetermined shape;

a plurality of polygonal cells to form code data; and

a plurality of corner cells having an identical shape,

wherein

the polygonal cells are provided outside an area surrounded by the plurality of corner cells.

13. The card according to claim 12, wherein the corner cells are assigned a color different from that of the reference cell and the polygonal cells.

14. The card according to claim 12 or 13, wherein the corner cells are triangular.

15. The card according to any one of claims 12 through 14, wherein the corner cells are aligned to the respective edges of the card and are assigned a color other than black.

16. A rectangular card comprising:

a reference cell having a predetermined shape;

a plurality of polygonal cells forming code data; and

a plurality of corner cells having an identical shape,

wherein

the plurality of corner cells are provided at a first edge and a second edge of the card opposite to each other, and

at least some of the plurality of polygonal cells are provided in the neighborhood of a third edge different from the first edge and the second edge and are arranged parallel with the third edge.

17. The card according to claim 16, wherein some of the plurality of polygonal cells are provided in the neighborhood of a fourth edge opposite to the third edge and are arranged parallel with the fourth edge, and wherein the plurality of polygonal cells provided in the neighborhood of the third edge and the fourth edge form a single two-dimensional code.

18. The card according to claim 16 or claim 17, wherein the polygonal cells and the reference cell are not formed in an area surrounded by the plurality of corner cells.

19. A game mat on which a game card is placed and which is provided with a gradation area in which brightness varies gradually.

20. The game mat according to claim 19, wherein a plurality of gradation areas are provided on the game mat, and the gradation areas have the same hue.

21. The game mat according to claim 19 or 20, wherein the outer edge of the gradation area is circular and brightness levels vary gradually and concentrically from high to low from the center of the gradation area toward the outer edge thereof.

22. A card game system comprising:

- a game card having a cell assigned a predetermined color;
- a game mat assigned a color of the same hue as the cell and provided with a gradation area in which brightness varies gradually;
- an imager which acquires a frame image by capturing an image of the game mat and an image of the game card placed on the game mat;
- a binarization processor which sets up a range of pixel values in the RGB format and translates the frame image into a binary bit representation;
- an extractor which extracts the gradation area on the game mat, from binary data for the frame image; and
- an adjuster which refers to binary data for the gradation area and accordingly adjusts the range of pixel values in the RGB format for binarization by the binarization processor.

23. The card game system according to claim 22, wherein the outer edge of the gradation area is circular and brightness levels vary gradually and concentrically from high to low from the center of the gradation area toward the outer edge thereof.

24. The card game system according to claim 22 or 23, wherein the gradation area comprises at least an area with a higher brightness level than that of the cell of the game card and an area with brightness levels lower than that of the cell.

25. An image analysis apparatus for analyzing a frame image capturing an image of a game card having a cell assigned a predetermined color and an image of a game mat which is assigned a color of the same hue as the cell and which is provided with a gradation area in which brightness varies gradually, comprising:

a binarization processor which sets up a range of pixel values in the RGB format so as to translate the frame image into a binary bit representation;

an extractor which extracts the gradation area on the game mat, from binary data for the frame image; and

an adjuster which refers to binary data for the gradation area and accordingly adjusts the range of pixel values in the RGB format for binarization by the binarization

processor.

26. An image analysis method for analyzing a frame image capturing an image of a game card having a cell assigned a predetermined color and an image of a game mat which is assigned a color of the same hue as the cell of the game card and which is provided with a gradation area in which brightness varies gradually, comprising:

setting up a range of pixel values in the RGB format so as to translate the frame image into a binary bit representation;

extracting the gradation area on the game mat, from binary data for the frame image; and

referring to binary data for the gradation area and accordingly adjusts the range of pixel values in the RGB format for binarization.

27. A computer readable recording medium having embodied thereon a program product comprising computer readable codes for causing a computer to analyze a frame image that captures an image of a game card having a cell assigned a predetermined color and an image of a game mat which is assigned a color of the same hue as the cell and which is provided with a gradation area in which brightness varies gradually, comprising:

a translating module which sets up a range of pixel

values in the RGB format so as to translate the frame image into a binary bit representation;

an extracting module which extracts the gradation area on the game mat, from binary data for the frame image; and

an adjusting module which refers to binary data for the gradation area and accordingly adjusts the range of pixel values in the RGB format for binarization.